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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/001,553	10/31/2001	Che-Bin Liu	2000P09023US01	7750

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EXAMINER	
MENGISTU, AMARE	
ART UNIT	**PAPER NUMBER**
2673	

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/001,553	LIU ET AL.	
	Examiner	Art Unit	
	Amare Mengistu	2673	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *19 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,8,18-20 and 25-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,8,18-20,25-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3, 8, 18-20, 25, 28, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiao 6,075,895 in view of Natsuko 6,252,599.

3. In regard to claims 1 and 18, Qiao discloses a method for determining a gesture comprising the steps of: determining a change in a background of an image from a plurality of images (see column 1, lines 64-67 and column 2, lines 1-5; movement of the person in the foreground causes changes in what parts of the background are visible); determining an object in the image (see column 2, lines 15-22 and figure 3, step 181); determining a trajectory of the object through the plurality of images (see column 3, lines 37-39 and figure 11, step 377); and classifying a gesture according to the trajectory of the object (see column 3, lines 27-30 and figure 3, step 185).

Qiao further discloses identifying a gesture according to the trajectory of the object. See column 6, lines 58-62, disclosing, "After the pre-processor 152 removes (step 181) the background image to generate the player's image, the template matcher 154 (step 183) the player's image to a number of templates to generate template outputs". Further see column 8, lines 61-62, disclosing, "the post processor 156

analyzes those outputs to identify the specific pre-defined gesture that corresponds" and lines 65-67, disclosing "the post-processor tracks (step 377) the player's body position". Such tracking through templates of body positions is understood to follow a trajectory, as best understood.

Qiao further discloses determining if the gesture corresponds to a valid command, and if the gesture corresponds to a valid command, the workstation automatically executing the command. See column 11, lines 11-16, disclosing, "Other approaches are applicable, such as a rule-based system...When an input is received, the ruled-based system compares it with its rules to generate the appropriate output." Thus, Qiao determines if the gesture corresponds to a valid command by comparing an input with rules and if the gesture corresponds to a valid command, the command, or "appropriate output" is executed. Further, see an example of these steps beginning on line 61 of column 11 to column 12, line 12.

Further in regard to claim 18, Qiao discloses a program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for determining a gesture (see column 5, lines 9-12).

Further in regard to claims 1 and 18, Qiao automatically controls a device, as best understood, because the gestures of a user automatically control the gesture recognizing device, in that the device receives the gestures and maps them, classifies them, etc., accordingly without further user control. Thus, the gesture recognizing device performs many functions automatically.

Qiao does not disclose that the method remotely issues commands to a medical imaging workstation or that the commands result in translational and rotational manipulation of a medical device.

Natsuko discloses an invention in which commands are remotely issued to a medical imaging workstation and the commands result in translational and rotational manipulation of a medical device. See column 6, lines 24-29, disclosing, "The operator determines a viewpoint location (a virtual endoscope lens position) in the internal space of the internal body tissue and inputs the viewpoint location via the input device 4. A FOV centerline direction (an optical axis direction of a virtual endoscope lens) is also input via the input device 4." Natsuko further disclosing various input devices that can be used as the input device 4, including a keyboard and track ball. See column 13, lines 6-18. Natsuko further discloses a command that corresponds to rotation of the virtual endoscope. See column 11, lines 50-57, disclosing, "a rotational angle is input via the input device 4. (The rotational angle represents a rotational angle around a pivot of the endoscope." Natsuko further discloses a command that corresponds to moving the virtual endoscope in a right to left direction (translation). Note above that the user determines a viewpoint location and FOV (field of view) centerline location. Thus, the virtual endoscope can inherently move in a right to left direction if the user commands a viewpoint or FOV centerline location that is to the left of the current location.

Qiao further teaches in column 1, lines 10-23, "In many action-oriented electronic games, a player guides...with an input device, such as a low-key-count keyboard, a joystick or an electronic pointing device, like a mouse...Though one can learn to

manipulate such input devices, it is not natural to act through a joystick or a keyboard. An alternative method to control...through gesture recognition. In such a method, the player's gesture controls the character's motion." Note that Qiao also discloses in column 12, line 30, "The present invention is not limited to playing games."

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the inventions of Qiao and Natsuko, having a virtual endoscope that is gesture-controlled. One would have been motivated to make such a change based on the teaching of Qiao that input devices such as keyboards and joysticks are not as natural to act through as gesture recognition, and since the invention of Natsuko can incorporate various input devices. Further, Qiao teaches that his invention can be used for applications other than games.

4. In regard to claims 2 and 19, Qiao discloses the step of determining the change in the background comprises the steps of: determining a gradient intensity map for the background from a plurality of images and for the current image; determining a comparison between the difference and a threshold (see column 2, lines 23-28); and determining a pixel to be a background pixel according to the comparison (see column 2, lines 34-37). Here, generating "the difference between the value of each pixel" is understood to mean determining a gradient intensity map because a gradient is generated by taking a difference between pixel values.

5. In regard to claims 3 and 20, Qiao discloses that the object includes a user's hand (see column 10, lines 38-51).

6. In regard to claims 8 and 25, Qiao discloses the step of identifying the gesture comprises the steps of: determining a reference point; determining a correspondence between the trajectory and the reference point; and classifying the trajectory according to one of a plurality of commands (see column 10, lines 38-51). Here, the "hand extended forward" is understood to be a determined reference point. Additionally, this limitation can be read on the "rest gesture" and movement away from that position (see column 10, lines 52-67 and figure 15).

7. In regard to claim 28, see rejection of claims 1 and 18.

8. In regard to claim 29, see rejection of claims 1 and 18.

9. In regard to claim 31, see rejection of claims 1 and 18.

10. Claims 26 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiao 6,075,895 in view of Natsuko 6,252,599 as applied to claims 1 and 18 above, and further in view of Funayama et al. 6,332,038 B1.

11. In regard to claims 26 and 34, Qiao in view of Natsuko discloses an invention similar to that which is claimed in claims 26 and 34. See rejections of claims 1 and 18 for similarities. Qiao in view of Natsuko does not disclose that determining the object in the image comprises the steps of obtaining a normalized color representation for a plurality of colors in each image, determining from training images an estimate of a probability distribution of normalized color values for an object class, and determining, for each pixel, a likelihood according to an estimated probability density of normalized color values for the object class.

Funayama et al. discloses an image processing device that detects an object in an image. See column 2, lines 15-18, disclosing, "For example, when the foregoing specified object domain is a human face, by using a probability density function derived from a color distribution of human faces, skin areas of faces can be separated from the base image." Thus, Funayama et al. determines from training images an estimate of a probability distribution of color values for an object class and determines a likelihood according to an estimated probability density of color values for the object class. See column 14, lines 57-59, disclosing that "the separability measurement process was carried out for...all pixels of the base image"; thus, the likelihood is determined for each pixel. See column 13, line 44, disclosing that "separability is a normalized quantity". It is understood that the color values are normalized, as normalization is conventional and necessary in order to compare images.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Qiao in view of Natsuko by determining an object on the image by obtaining a normalized color representation for a plurality of colors in each image, determining from training images an estimate of a probability distribution of normalized color values for an object class, and determining, for each pixel, a likelihood according to an estimated probability density of normalized color values for the object class. One would have been motivated to make such a modification based on the teaching of Funayama et al. to use a probability density function derived from a color distribution of the object class in order to separate an object from an image, thereby determining an object in the image. Also, the

normalization of color values is conventional and necessary in order to compare images for any purpose, including object determination.

12. Claims 27 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiao 6,075,895 in view of Natsuko 6,252,599 as applied to claims 1 and 18 above, and further in view of Marrin et al. 5,875,257.

13. In regard to claim 27, Qiao in view of Natsuko discloses an invention similar to that which is disclosed in claim 27. See rejection of claim 1 for similarities. Qiao in view of Natsuko does not disclose that executing the command further comprises the steps of determining the duration of the gesture and correlating the duration of the gesture to a intensity and scale in which the command is executed.

Marrin discloses an invention in which the duration of the gesture is determined and correlates to a intensity and scale in which the command is executed. See column 8, lines 25-28 and 43-46, disclosing, "The tempo dictates the speed at which the musical composition is rendered, as well as its timing pattern, and is determined primarily from two-dimensional gesture, baton speed (or velocity), and the time between beats." Thus, the command is the tempo and the duration of the gesture, which correlates in scale and intensity to the speed of the baton movement (since speed takes into account the amount of motion in a period of time). Further see column 8, lines 43-46, disclosing, "Interpreter 235 may be programmed to detect indication of impending tempo increases or decreases (e.g., through analysis of baton speed and direction)".

Marrin further teaches that his invention "relates to electronic control, and in particular to gestural control of systems capable of exhibiting continuous, dynamically changeable behavior."

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Qiao by having executing the command further comprise the steps of determining the duration of the gesture and correlating the duration of the gesture to a intensity and scale in which the command is executed, as in the invention of Marrin. One would have been motivated to make such a change, since both inventions "relate to electronic control, and in particular to gestural control of systems capable of exhibiting continuous, dynamically changeable behavior."

14. In regard to claim 33, Qiao further discloses that repetition of a command increases the intensity of the command response. It is understood that repetition of a command would cause the command to be carried out as many times as the repetition occurs. Thus, the intensity of the command response increases accordingly. For example, if a command is repeated once, then it is carried out twice and the intensity of the command is twice what it would be if not repeated at all.

15. Claims 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Qiao et al. 6,075,895 in view of Natsuko et al. 6,252,599 B1 as applied to claims 28, 29 and 31 above, and further in view of Iwamura 6,501,515 B1.

16. In regard to claims 30 and 32, Qiao in view of Natsuko disclose an invention similar to that which is claimed in claims 30 and 32. See rejections of claims 1, 18, 28,

29 and 31 for similarities. Qiao in view of Natsuko do not disclose that the gesture is specifically a rotation of a user's hand or a waving of a user's hand from right to left.

Iwamura discloses an invention in which the rotation of a user's hand and a waving of a user's hand from right to left correspond to gesture commands. See figure 2, depicting the rotation of a user's hand and figures 11 and 16, depicting waving of a user's hand from upper right to lower left and from lower left to upper right.

Iwamure further teaches in column 5, lines 29-52, "The special hand motion is not limited to a circular move. Any other special gesture will do... For example, as a variation of the circular hand motion, the user 18 may move the hand 20 several times (for example twice) toward diagonal direction, for example, lower left to upper right... Compared with the circular motion shown in FIG. 2, this is an easier motion for the user 18 to make and also easier to detect for the system. A drawback is that such a motion is more likely to occur unintentionally than the circular motion and, thus, misdetection could occur more frequently... It is a tradeoff."

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Qiao in view of Natsuko by having gestures be a rotation of a user's hand or a waving of a user's hand from right to left, as in the invention of Iwamura. One would have been motivated to make such a change based on the teaching of Iwamura that "any other special gesture will do" and that the selection of the particular gesture for a command is a tradeoff, which is also common and conventional knowledge in the selection of gestures for gesture-recognition technologies.

Response to Arguments

17. Applicant's arguments filed on May 19,2005 have been fully considered but they are not persuasive.

Applicant's arguments, (see page 7, second paragraph, filed on May 19 2005), that Qiao action performed by the device is not an exact replication of the detected gesture. In the present invention, the gesture is effectively a shorthand instruction that is received and interpreted by the device. Furthermore Qiao does not teach or discloses a system or method that determines whether a gesture corresponds to a valid command and then instructing a device to execute the command resulting in rotation and translation of the medical device.

First, Applicant's claim invention never recites that the gesture is effectively a shorthand instruction that is received and interpreted by the device.

Second, as to Qiao does not teach or discloses a system or method that determines whether a gesture corresponds to a valid command. The examiner strongly disagrees with Applicant's assertion. Qiao clearly discloses determining whether a gesture corresponds to a valid command (see, col.11, lines 11-16, also see, figs. 11 and 15).

Applicant also argues that Natsuko does not teach or disclose a method for automatically remotely issuing commands to a medical imaging workstation. Qiao automatically controls a device, as best understood, because the gestures of a user automatically control the gesture recognizing device, in that the device receives the

gestures and maps them, classifies them, etc., accordingly without further user control. Thus, the gesture recognizing device performs many functions automatically.

Natsuko is cited to teach in which commands are remotely issued to a medical imaging workstation and the commands result in translational and rotational manipulation of a medical device (See col. 6, lines 24-29, col.11, lines 44-57,6-18).

Thus, the combination of Qiao's teachings of a gestures automatically controlling a device with Natsuko's teachings of a commands remotely issuing to a medical imaging workstation clearly reads on applicant's claimed invention.

Applicant is attacking references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

On page 9, Applicant states that Funayama does not teach a method for automatically remotely issuing commands to a medical imaging workstation. Qiao and Natsuko are the one which are cited to teach this claim limitation and not Funayama, Marrin or Iwamura.

Conclusion

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amare Mengistu whose telephone number is (571) 272-7674. The examiner can normally be reached on M-F,T-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on (571) 272-7681. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Amare Mengistu
Primary Examiner
Art Unit 2673

AM

June 26,2005